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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,623	12/06/2001	Malcolm R. Schuler	3016664 (17732.6310.003)	3753

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EXAMINER	
MARKOFF, ALEXANDER	

ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/008,623	SCHULER ET AL.	
	Examiner	Art Unit	
	Alexander Markoff	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *14,27 and 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14, 27 and 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 14 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shwartzman et al (US Patent 4,118,649).

Shwartzman et al teach a method as claimed except for specific recitation of the orientation of the short and long sides of the transducers. See entire document especially column 1, lines 35-56, column 2, lines 24-30, column 3, lines 28-49.

However, since, the document recites rectangular transducers and does not require a specific orientation of the sides any of the possible orientations is encompassed by the document. Moreover, the document teaches that the transducers should be closed packed to each other.

It would have been obvious to an ordinary artisan at the time the invention was made that close packing of the rectangular transducers in a rectangular assembly would require side by side placement of the transducers with the sides parallel to the sides of the assembly.

Thus, it would have been obvious to an ordinary artisan at the time the invention was made to place the rectangular transducers of Shwartzman et al in the rectangular assembly of Shwartzman et al with the short sides of the transducers parallel to any of two sides of the assembly. Thus, the limitation of claims 13 and 14 would be met by either of such positions, and the limitation of claim 27 would be met by one of the two of the positions.

It is noted, that no unexpected results was achieved by the specific orientation of the sides of the transducer in the rectangular assembly disclosed by the instant application.

5. Claims 14, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US Patent No 6,085,764) in view of Handbook of Semiconductor Wafer Cleaning Technology (HSWCT) and Shwartzman et al and Bran.

Kobayashi et al teaches a method as claimed except for the use of megasonic frequency and specifying the proportions of the dimensions of the transducer. See entire document, especially Fig. 1 and Description of the Preferred Embodiment. The movement of the wafers relative to the wafers in Kobayashi et al is the same as the movement of the wafers shown on Figs. 1 and 2 of the instant application.

Kobayashi et al teach the use of ultrasonic cavitation for cleaning.

The HSWCT teaches (page 141) that ultrasonic cavitation can cause a surface damage. The document recommends the use of megasonic waves produced by arrays of megasonic transducers to avoid the surface damage.

It would have been obvious to an ordinary artisan at the time the invention was made to use an array of megasonic transducers instead of the ultrasonic vibrator 12 in the method of Kobayashi et al in order to prevent damage from ultrasonic cavitation with reasonable expectation of success because the HSWCT recommends that.

As to the proportions of the edges of the surface of the transducer: Kobayashi et al does not specify the shape or proportions for the transducer. It would have been obvious to an ordinary artisan at the time the invention was made to use a transducers with any suitable shape and proportions, which would ensure adequate cleaning results with reasonable expectation of success.

Shwartzman et al and Bran teach that rectangular transducers were conventional in the art of the semiconductor wafer cleaning.

It would have been obvious to an ordinary artisan at the time the invention was made to use a conventional rectangular transducers in Kobayashi et al with reasonable expectation of success. It would also have been obvious to an ordinary artisan to place the rectangular transducers parallel to the sides of the bath of Kobayashi et al in order to simplify the mounting and construction and since Bran shows such as conventional.

Thus the claimed limitations would be met by one of the two obvious positions of the transducers.

It is noted that no unexpected results were achieved by the use of the claimed proportions of the transducer.

6. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shwartzman et al (US Patents No 4,118,649) as it applied to claims 13 and 27 above, further in view of Kobayashi et al (US Patent No 6,085,764).

Scwartzman et al do not teach the use of transducers placed at the bottom of the tank.

However, such was conventional in the art as evidenced by Kobayashi et al.

It would have been obvious to an ordinary artisan at the time the invention was made to place the transducers of Shwartzman et al at the bottom of the treatment tank in order to simplify the construction of the apparatus and manipulating the wafers with

reasonable expectation of adequate results because Kobayshi et al teach such as conventional in the methods for treatment wafers.

Response to Arguments

7. Applicant's arguments filed 10/15/07 have been fully considered but they are not persuasive.

The applicants allege that the rejection over Shwartzman et al is not proper.

The applicants allege that they determined that moving the wafers in the claimed direction ensures that the wafers are moved through the maximum of the megasonic energy.

The applicants, however, fails to show any unexpected results achieved by such movement.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

The applicants allege that the rejection over Kobayashi et al in view of Handbook of Semiconductor Wafer Cleaning Technology (HSWCT) and Shwartzman et

al and Bran is not proper because Kobayashi et al require cavitation and because the modification will render Kobayashi et al inoperable.

This is not persuasive.

It appears that the applicants ignore the teaching of the HSWCT teaches, which states (page 141) that ultrasonic cavitation can cause a surface damage. The document recommends the use of megasonic waves produced by arrays of megasonic transducers to avoid the surface damage.

The modification would not lead to an not operable embodiment, in opposite the modification would provide an enhance result, which is recognized in the industry and disclosed by the industry Handbook.

The applicants further argue with respect to claim 29 that it is not proper to combine Swartzman et al with Kobayashi et al because of the different frequencies used.

This is not persuasive because the teaching of Kobayashi et al was used to show that placing of the transducers at the bottom of the tank was conventional in the art.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Markoff whose telephone number is 571-272-1304. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alexander Markoff
Primary Examiner
Art Unit 1792

AM

ALEXANDER MARKOFF
PRIMARY EXAMINER